

## SEQUENCE LISTING

<110> Nemerow, Glen R.  
Li, Erguang

<120> BIFUNCTIONAL MOLECULES AND VECTORS COMPLEXED THEREWITH FOR TARGETED  
GENE DELIVERY

<130> 22908-1228

<140> Herewith

<141> 2001-07-10

<150> converted to a provisional from 09/613,017)

<151> 2000-07-10

<160> 33

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 1516

<212> DNA

<213> Mouse

<220>

<221> CDS

<222> (28)...(1395)

<223> DAV-1 heavy chain, penton base monoclonal antibody

<400> 1

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                        Met Gly Trp Ser Trp Ile Phe Leu Phe
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ctc ctg tca gga act gca ggc gtc cac tct gag gtc cag ctt cag cag      102
Leu Leu Ser Gly Thr Ala Gly Val His Ser Glu Val Gln Leu Gln Gln
 10                15                20                25

tca gga cct gag ctg gtg aaa cct ggg gcc tca gtg aag ata tcc tgc      150
Ser Gly Pro Glu Leu Val Lys Pro Gly Ala Ser Val Lys Ile Ser Cys
                30                35                40

aag gct tct gga tac aca ttc act gac tac aac atg cac tgg gtg aag      198
Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr Asn Met His Trp Val Lys
                45                50                55

cag agc cat gga aag agc ctt gag tgg att gga tat att tat cct tac      246
Gln Ser His Gly Lys Ser Leu Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr
                60                65                70

aaa ggt ggt act ggc tac aac cag aag ttc aag agc aag gcc aca ttg      294
Lys Gly Gly Thr Gly Tyr Asn Gln Lys Phe Lys Ser Lys Ala Thr Leu
                75                80                85

aca aca gac agt tcc tcc aac aca gcc tac atg gag ctc cgc agc ctg      342
Thr Thr Asp Ser Ser Ser Asn Thr Ala Tyr Met Glu Leu Arg Ser Leu
 90                95                100                105

aca tct gat gcc tct gca gtc tat tac tgt gca aga ggg att gct tac      390
Thr Ser Asp Ala Ser Ala Val Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr
                110                115                120

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tgg ggc caa ggg act ctg gtc act gtc tct gca gcc aaa acg aca ccc	438
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala Ala Lys Thr Pro	
125 130 135	
cca tct gtc tat cca ctg gcc cct gga tct gct gcc caa act aac tcc	486
Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser	
140 145 150	
atg gtg acc ctg gga tgc ctg gtc aag ggc tat ttc cct gag cca gtg	534
Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val	
155 160 165	
aca gtg acc tgg aac tct gga tcc ctg tcc agc ggt gtg cac acc ttc	582
Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe	
170 175 180 185	
cca gct gtc ctg cag tct gac ctc tac act ctg agc agc tca gtg act	630
Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr	
190 195 200	
gtc ccc tcc agc acc tgg ccc agc gag acc gtc acc tgc aac gtt gcc	678
Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala	
205 210 215	
cac ccg gcc agc agc acc aag gtg gac aag aaa att gtg ccc agg gat	726
His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp	
220 225 230	
tgt ggt tgt aag cct tgc ata tgt aca gtc cca gaa gta tca tct gtc	765
Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val	
235 240 245	
ttc atc ttc ccc cca aag ccc aag gat gtg ctc acc att act ctg act	822
Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr	
250 255 260 265	
cct aag gtc acg tgt gtt gtg gta gac atc agc aag gat gat ccc gag	870
Pro Lys Val Thr Cys Val Val Val Asp Ile Ser Lys Asp Asp Pro Glu	
270 275 280	
gtc cag ttc agc tgg ttt gta gat gat gtg gag gtg cac aca gct cag	918
Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln	
285 290 295	
acg caa ccc cgg gag gag cag ttc aac agc act ttc cgc tca gtc agt	966
Thr Gln Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Ser Val Ser	
300 305 310	
gaa ctt ccc atc atg cac cag gac tgg ctc aat ggc aag gag ttc aaa	1014
Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys	
315 320 325	
tgc agg gtc aac agt gca gct ttc cct gcc ccc atc gag aaa acc atc	1062
Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile	
330 335 340 345	
tcc aaa acc aaa ggc aga ccg aag gct cca cag gtg tac acc att cca	1110
Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro	
350 355 360	
cct ccc aag gag cag atg gcc aag gat aaa gtc agt ctg acc tgc atg	1158

Pro	Pro	Lys	Glu	Gln	Met	Ala	Lys	Asp	Lys	Val	Ser	Leu	Thr	Cys	Met		
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ata	aca	gac	ttc	ttc	cct	gaa	gac	att	act	gtg	gag	tgg	cag	tgg	aat	1206	
Ile	Thr	Asp	Phe	Phe	Pro	Glu	Asp	Ile	Thr	Val	Glu	Trp	Gln	Trp	Asn		
		380					385					390					
ggg	cag	cca	gcg	gag	aac	tac	aag	aac	act	cag	ccc	atc	atg	gac	aca	1254	
Gly	Gln	Pro	Ala	Glu	Asn	Tyr	Lys	Asn	Thr	Gln	Pro	Ile	Met	Asp	Thr		
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gat	ggc	tct	tac	ttc	gtc	tac	agc	aag	ctc	aat	gtg	cag	aag	agc	aac	1302	
Asp	Gly	Ser	Tyr	Phe	Val	Tyr	Ser	Lys	Leu	Asn	Val	Gln	Lys	Ser	Asn		
410					415					420					425		
tgg	gag	gca	gga	aat	act	ttc	atc	tgc	tct	gtg	tta	cat	gag	ggc	ctg	1350	
Trp	Glu	Ala	Gly	Asn	Thr	Phe	Ile	Cys	Ser	Val	Leu	His	Glu	Gly	Leu		
				430				435						440			
cac	aac	cac	cat	act	gag	aag	agc	ctc	tcc	cac	tct	cct	ggt	aaa		1395	
His	Asn	His	His	Thr	Glu	Lys	Ser	Leu	Ser	His	Ser	Pro	Gly	Lys			
			445					450					455				
tgatcccagt	gtccttggag	ccctctgggc	ctacaggact	ctgtcaccta	cctccacccc	1455											
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a						1516											

&lt;210&gt; 2

&lt;211&gt; 456

&lt;212&gt; PRT

&lt;213&gt; Mouse

&lt;220&gt;

&lt;221&gt; PEPTIDE

&lt;222&gt; (0)...(0)

&lt;223&gt; DAV-1 heavy chain, penton base monoclonal antibody

&lt;400&gt; 2

Met	Gly	Trp	Ser	Trp	Ile	Phe	Leu	Phe	Leu	Leu	Ser	Gly	Thr	Ala	Gly		
1				5					10					15			
Val	His	Ser	Glu	Val	Gln	Leu	Gln	Gln	Ser	Gly	Pro	Glu	Leu	Val	Lys		
			20					25					30				
Pro	Gly	Ala	Ser	Val	Lys	Ile	Ser	Cys	Lys	Ala	Ser	Gly	Tyr	Thr	Phe		
		35				40						45					
Thr	Asp	Tyr	Asn	Met	His	Trp	Val	Lys	Gln	Ser	His	Gly	Lys	Ser	Leu		
	50				55					60							
Glu	Trp	Ile	Gly	Tyr	Ile	Tyr	Pro	Tyr	Lys	Gly	Gly	Thr	Gly	Tyr	Asn		
65				70					75					80			
Gln	Lys	Phe	Lys	Ser	Lys	Ala	Thr	Leu	Thr	Asp	Ser	Ser	Ser	Ser	Asn		
			85					90					95				
Thr	Ala	Tyr	Met	Glu	Leu	Arg	Ser	Leu	Thr	Ser	Asp	Ala	Ser	Ala	Val		
			100					105					110				
Tyr	Tyr	Cys	Ala	Arg	Gly	Ile	Ala	Tyr	Trp	Gly	Gln	Gly	Thr	Leu	Val		
		115				120					125						
Thr	Val	Ser	Ala	Ala	Lys	Thr	Thr	Pro	Pro	Ser	Val	Tyr	Pro	Leu	Ala		
	130					135				140							
Pro	Gly	Ser	Ala	Ala	Gln	Thr	Asn	Ser	Met	Val	Thr	Leu	Gly	Cys	Leu		
145					150				155					160			
Val	Lys	Gly	Tyr	Phe	Pro	Glu	Pro	Val	Thr	Val	Thr	Trp	Asn	Ser	Gly		
			165					170					175				
Ser	Leu	Ser	Ser	Gly	Val	His	Thr	Phe	Pro	Ala	Val	Leu	Gln	Ser	Asp		
			180					185					190				

Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro  
 195 200 205  
 Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys  
 210 215 220  
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile  
 225 230 235 240  
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro  
 245 250 255  
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val  
 260 265 270  
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val  
 275 280 285  
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln  
 290 295 300  
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln  
 305 310 315 320  
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala  
 325 330 335  
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro  
 340 345 350  
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala  
 355 360 365  
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu  
 370 375 380  
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr  
 385 390 395 400  
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr  
 405 410 415  
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe  
 420 425 430  
 Ile Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr Glu Lys  
 435 440 445  
 Ser Leu Ser His Ser Pro Gly Lys  
 450 455

<210> 3  
 <211> 831  
 <212> DNA  
 <213> Mouse

<220>  
 <221> CDS  
 <222> (13)...(726)  
 <223> DAV-1 light chain, penton base monoclonal antibody

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 1 5 10  
 tgg gtt cca ggc tcc act ggt gac att gtg ctg acc caa tct cca gct 99  
 Trp Val Pro Gly Ser Thr Gly Asp Ile Val Leu Thr Gln Ser Pro Ala  
 15 20 25  
 tct ttg gct gtg tct cta ggg cag agg gcc acc atc tcc tgc aag gcc 147  
 Ser Leu Ala Val Ser Leu Gly Gln Arg Ala Thr Ile Ser Cys Lys Ala  
 30 35 40 45  
 agc caa agt gtt gat tat gat ggt gat agt tat atg aac tgg tac caa 195  
 Ser Gln Ser Val Asp Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln  
 50 55 60

cag aaa cca gga cag cca ccc aaa ctc ctc atc tat gct gca tcc aat 243  
 Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr Ala Ala Ser Asn  
                     65                    70                    75

tta gaa tct ggg atc cca gcc agg ttt agt ggc agt ggg tct ggg aca 291  
 Leu Glu Ser Gly Ile Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr  
                     80                    85                    90

gac ttc acc ctc aac atc cat cct gtg gag gag gag gat gct gca acc 339  
 Asp Phe Thr Leu Asn Ile His Pro Val Glu Glu Glu Asp Ala Ala Thr  
                     95                    100                    105

tat tac tgt cag caa act aat gag gat ccg tgg acg ttc ggt gga ggc 387  
 Tyr Tyr Cys Gln Gln Thr Asn Glu Asp Pro Trp Thr Phe Gly Gly Gly  
 110                    115                    120                    125

acc aag ctg gaa atc aaa cgg gct gat gct gca cca act gta tcc atc 435  
 Thr Lys Leu Glu Ile Lys Arg Ala Asp Ala Ala Pro Thr Val Ser Ile  
                     130                    135                    140

ttc cca cca tcc agt gag cag tta aca tct gga ggt gcc tca gtc gtg 483  
 Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly Gly Ala Ser Val Val  
                     145                    150                    155

tgc ttc ttg aac aac ttc tac ccc aaa gac atc aat gtc aag tgg aag 531  
 Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys  
                     160                    165                    170

att gat ggc agt gaa cga caa aat ggc gtc ctg aac agt tgg act gat 579  
 Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu Asn Ser Trp Thr Asp  
                     175                    180                    185

cag gac agc aaa gac agc acc tac agc atg agc agc acc ctc acg ttg 627  
 Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu  
 190                    195                    200                    205

acc aag gac gag tat gaa cga cat aac agc tat acc tgt gag gcc act 675  
 Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr Thr Cys Glu Ala Thr  
                     210                    215                    220

cac aag aca tca act tca ccc att gtc aag agc ttc aac agg aat gag 723  
 His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser Phe Asn Arg Asn Glu  
                     225                    230                    235

tgt tagagacaaa ggctctgaga cgccaccacc agctccccag ctccatccta 776  
 Cys

tcttccttc taaggtcttg gaggttcct cgagcggtaa agggcgaatt ccagc 831

<210> 4  
 <211> 238  
 <212> PRT  
 <213> Mouse

<220>  
 <221> PEPTIDE  
 <222> (0)...(0)  
 <223> DAV-1 light chain, penton base monoclonal antibody

<400> 4  
 Met Glu Thr Asp Thr Ile Leu Leu Trp Val Leu Leu Leu Trp Val Pro

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<220>
<221> CDS
<222> (0)...(1314)
<223> Portion of DAV-1 heavy chain used for fusion protein
bifunctional antibody
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-6 of 20-

cag aag ttc aag agc aag gcc aca ttg aca aca gac agt tcc tcc aac	288
Gln Lys Phe Lys Ser 85 Lys Ala Thr Leu 90 Thr Asp Ser Ser 95 Asn	
aca gcc tac atg gag ctc cgc agc ctg aca tct gat gcc tct gca gtc	336
Thr Ala Tyr Met 100 Glu Leu Arg Ser 105 Leu Thr Ser Asp Ala Ser 110 Ala Val	
tat tac tgt gca aga ggg att gct tac tgg ggc caa ggg act ctg gtc	384
Tyr Tyr Cys 115 Ala Arg Gly Ile 120 Ala Tyr Trp Gly Gln Gly 125 Thr Leu Val	
act gtc tct gca gcc aaa acg aca ccc cca tct gtc tat cca ctg gcc	432
Thr Val Ser Ala Ala Lys 135 Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala	
cct gga tct gct gcc caa act aac tcc atg gtg acc ctg gga tgc ctg	480
Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu 160	
gtc aag ggc tat ttc cct gag cca gtg aca gtg acc tgg aac tct gga	528
Val Lys Gly Tyr Phe 165 Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly 175	
tcc ctg tcc agc ggt gtg cac acc ttc cca gct gtc ctg cag tct gac	576
Ser Leu Ser 180 Ser Gly Val His Thr 185 Phe Pro Ala Val Leu Gln Ser Asp 190	
ctc tac act ctg agc agc tca gtg act gtc ccc tcc agc acc tgg ccc	624
Leu Tyr Thr 195 Leu Ser Ser Ser 200 Val Thr Val Pro Ser 205 Ser Thr Trp Pro	
agc gag acc gtc acc tgc aac gtt gcc cac ccg gcc agc agc acc aag	672
Ser Glu Thr Val Thr Cys 215 Asn Val Ala His Pro Ala Ser Ser Thr Lys 220	
gtg gac aag aaa att gtg ccc agg gat tgt ggt tgt aag cct tgc ata	720
Val Asp Lys Lys Ile 230 Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile 240	
tgt aca gtc cca gaa gta tca tct gtc ttc atc ttc ccc cca aag ccc	768
Cys Thr Val Pro 245 Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro 255	
aag gat gtg ctc acc att act ctg act cct aag gtc acg tgt gtt gtg	816
Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val 270	
gta gac atc agc aag gat gat ccc gag gtc cag ttc agc tgg ttt gta	864
Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val 285	
gat gat gtg gag gtg cac aca gct cag acg caa ccc cgg gag gag cag	912
Asp Asp Val Glu Val His Thr 295 Ala Gln Thr Gln Pro Arg Glu Glu Gln 300	
ttc aac agc act ttc cgc tca gtc agt gaa ctt ccc atc atg cac cag	960
Phe Asn Ser Thr Phe 310 Arg Ser Val Ser Glu 315 Leu Pro Ile Met His Gln 320	
gac tgg ctc aat ggc aag gag ttc aaa tgc agg gtc aac agt gca gct	1008

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<210> 6
<211> 438
<212> PRT
<213> Mouse

<220>
<221> PEPTIDE
<222> (0)...(0)
<223> Portion of DAV-1 heavy chain used for fusion protein
bifunctional antibody
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-8 of 20-



Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu  
 145 150 155 160  
 Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly  
 165 170 175  
 Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp  
 180 185 190  
 Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro  
 195 200 205  
 Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys  
 210 215 220  
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile  
 225 230 235 240  
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro  
 245 250 255  
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val  
 260 265 270  
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val  
 275 280 285  
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln  
 290 295 300  
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln  
 305 310 315 320  
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala  
 325 330 335  
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro  
 340 345 350  
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Lys Glu Gln Met Ala  
 355 360 365  
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu  
 370 375 380  
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr  
 385 390 395 400  
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr  
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 420 425 430  
 Ile Cys Ser Val Leu His  
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<210> 7  
 <211> 157  
 <212> PRT  
 <213> Human  
 <220>  
 <221> PEPTIDE  
 <222> (0)...(0)  
 <223> Tumor necrosis factor-alpha (TNF alpha, mature peptide)

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 20 25 30  
 Ala Asn Ala Leu Leu Ala Asn Gly Val Glu Leu Arg Asp Asn Gln Leu  
 35 40 45  
 Val Val Pro Ser Glu Gly Leu Tyr Leu Ile Tyr Ser Gln Val Leu Phe  
 50 55 60  
 Lys Gly Gln Gly Cys Pro Ser Thr His Val Leu Leu Thr His Thr Ile  
 65 70 75 80

Ser Arg Ile Ala Val Ser Tyr Gln Thr Lys Val Asn Leu Leu Ser Ala  
                   85                  90  
 Ile Lys Ser Pro Cys Gln Arg Glu Thr Pro Glu Gly Ala Glu Ala Lys  
                   100                  105                  110  
 Pro Trp Tyr Glu Pro Ile Tyr Leu Gly Gly Val Phe Gln Leu Glu Lys  
                   115                  120                  125  
 Gly Asp Arg Leu Ser Ala Glu Ile Asn Arg Pro Asp Tyr Leu Asp Phe  
                   130                  135                  140  
 Ala Glu Ser Gly Gln Val Tyr Phe Gly Ile Ile Ala Leu  
 145                  150                  155

<210> 8  
 <211> 70  
 <212> PRT  
 <213> Human

<220>  
 <221> PEPTIDE  
 <222> (0)...(0)  
 <223> Human Insulin-like Growth Factor 1 sequence  
           (IGF-1, mature peptide)

<400> 8  
 Gly Pro Glu Thr Leu Cys Gly Ala Glu Leu Val Asp Ala Leu Gln Phe  
   1                  5                  10                  15  
 Val Cys Gly Asp Arg Gly Phe Tyr Phe Asn Lys Pro Thr Gly Tyr Gly  
                   20                  25                  30  
 Ser Ser Ser Arg Arg Ala Pro Gln Thr Gly Ile Val Asp Glu Cys Cys  
                   35                  40                  45  
 Phe Arg Ser Cys Asp Leu Arg Arg Leu Glu Met Tyr Cys Ala Pro Leu  
                   50                  55                  60  
 Lys Pro Ala Lys Ser Ala  
 65                  70

<210> 9  
 <211> 53  
 <212> PRT  
 <213> Human

<220>  
 <221> PEPTIDE  
 <222> (0)...(0)  
 <223> Epidermal Growth Factor (EGF, mature peptide)

<400> 9  
 Asn Ser Asp Ser Glu Cys Pro Leu Ser His Asp Gly Tyr Cys Leu His  
   1                  5                  10                  15  
 Asp Gly Val Cys Met Tyr Ile Glu Ala Leu Asp Lys Tyr Ala Cys Asn  
                   20                  25                  30  
 Cys Val Val Gly Tyr Ile Gly Glu Arg Cys Gln Tyr Arg Asp Leu Lys  
                   35                  40                  45  
 Trp Trp Glu Leu Arg  
                   50

<210> 10  
 <211> 164  
 <212> PRT  
 <213> Human

<220>  
 <221> PEPTIDE  
 <222> (0)...(0)

<223> Stem Cell Factor (SCF, mature peptide)

<400> 10

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Glu Gly Ile Cys Arg Asn Arg Val Thr Asn Asn Val Lys Asp Val Thr
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Lys Leu Val Ala Asn Leu Pro Lys Asp Tyr Met Ile Thr Leu Lys Tyr
          20          25          30
Val Pro Gly Met Asp Val Leu Pro Ser His Cys Trp Ile Ser Glu Met
          35          40          45
Val Val Gln Leu Ser Asp Ser Leu Thr Asp Leu Leu Asp Lys Phe Ser
          50          55          60
Asn Ile Ser Glu Gly Leu Ser Asn Tyr Ser Ile Ile Asp Lys Leu Val
65          70          75          80
Asn Ile Val Asp Asp Leu Val Glu Cys Val Lys Glu Asn Ser Ser Lys
          85          90          95
Asp Leu Lys Lys Ser Phe Lys Ser Pro Glu Pro Arg Leu Phe Thr Pro
          100          105          110
Glu Glu Phe Phe Arg Ile Phe Asn Arg Ser Ile Asp Ala Phe Lys Asp
          115          120          125
Phe Val Val Ala Ser Glu Thr Ser Asp Cys Val Val Ser Ser Thr Leu
          130          135          140
Ser Pro Glu Lys Asp Ser Arg Val Ser Val Thr Lys Pro Phe Met Leu
145          150          155          160
Pro Pro Val Ala

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<210> 11

<211> 597

<212> PRT

<213> Artificial Sequence

<220>

<223> Fusion protein with N-terminal portion of DAV-1 heavy chain  
and TNF alpha mature peptide

<400> 11

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Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
 1          5          10          15
Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
          20          25          30
Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
          35          40          45
Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu
50          55          60
Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn
65          70          75          80
Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Ser Asn
          85          90          95
Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val
          100          105          110
Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val
          115          120          125
Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala
130          135          140
Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu
145          150          155          160
Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly
          165          170          175
Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp
          180          185          190
Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro
195          200          205

```

Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys  
 210 215 220  
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile  
 225 230 235 240  
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro  
 245 250 255  
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val  
 260 265 270  
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val  
 275 280 285  
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln  
 290 295 300  
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln  
 305 310 315 320  
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala  
 325 330 335  
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro  
 340 345 350  
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala  
 355 360 365  
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu  
 370 375 380  
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr  
 385 390 395 400  
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr  
 405 410 415  
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe  
 420 425 430  
 Ile Cys Ser Val Leu His Glu Phe Val Arg Ser Ser Ser Arg Thr Pro  
 435 440 445  
 Ser Asp Lys Pro Val Ala His Val Val Ala Asn Pro Gln Ala Glu Gly  
 450 455 460  
 Gln Leu Gln Trp Leu Asn Arg Arg Ala Asn Ala Leu Leu Ala Asn Gly  
 465 470 475 480  
 Val Glu Leu Arg Asp Asn Gln Leu Val Val Pro Ser Glu Gly Leu Tyr  
 485 490 495  
 Leu Ile Tyr Ser Gln Val Leu Phe Lys Gly Gln Gly Cys Pro Ser Thr  
 500 505 510  
 His Val Leu Leu Thr His Thr Ile Ser Arg Ile Ala Val Ser Tyr Gln  
 515 520 525  
 Thr Lys Val Asn Leu Leu Ser Ala Ile Lys Ser Pro Cys Gln Arg Glu  
 530 535 540  
 Thr Pro Glu Gly Ala Glu Ala Lys Pro Trp Tyr Glu Pro Ile Tyr Leu  
 545 550 555 560  
 Gly Gly Val Phe Gln Leu Glu Lys Gly Asp Arg Leu Ser Ala Glu Ile  
 565 570 575  
 Asn Arg Pro Asp Tyr Leu Asp Phe Ala Glu Ser Gly Gln Val Tyr Phe  
 580 585 590  
 Gly Ile Ile Ala Leu  
 595

&lt;210&gt; 12

&lt;211&gt; 510

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

 <223> Fusion protein with N-terminal portion of DAV-1 heavy chain  
 and IGF-1 mature peptide

&lt;400&gt; 12

Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly

1 5 10 15  
 Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys  
 20 30  
 Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe  
 35 40 45  
 Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu  
 50 55 60  
 Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn  
 65 70 75 80  
 Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Ser Asn  
 85 90 95  
 Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val  
 100 105 110  
 Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val  
 115 120 125  
 Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala  
 130 135 140  
 Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu  
 145 150 155 160  
 Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly  
 165 170 175  
 Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp  
 180 185 190  
 Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro  
 195 200 205  
 Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys  
 210 215 220  
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile  
 225 230 235 240  
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro  
 245 250 255  
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val  
 260 265 270  
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val  
 275 280 285  
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln  
 290 295 300  
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln  
 305 310 315 320  
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala  
 325 330 335  
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro  
 340 345 350  
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala  
 355 360 365  
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu  
 370 375 380  
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr  
 385 390 395 400  
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr  
 405 410 415  
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe  
 420 425 430  
 Ile Cys Ser Val Leu His Glu Phe Gly Pro Glu Thr Leu Cys Gly Ala  
 435 440 445  
 Glu Leu Val Asp Ala Leu Gln Phe Val Cys Gly Asp Arg Gly Phe Tyr  
 450 455 460  
 Phe Asn Lys Pro Thr Gly Tyr Gly Ser Ser Ser Arg Arg Ala Pro Gln  
 465 470 475 480  
 Thr Gly Ile Val Asp Glu Cys Cys Phe Arg Ser Cys Asp Leu Arg Arg  
 485 490 495  
 Leu Glu Met Tyr Cys Ala Pro Leu Lys Pro Ala Lys Ser Ala

500

505

<210> 13  
 <211> 493  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Fusion protein with N-terminal portion of DAV-1 heavy chain  
 and EGF mature peptide

<400> 13  
 Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly  
 1 5 10 15  
 Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys  
 20 25 30  
 Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe  
 35 40 45  
 Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu  
 50 55 60  
 Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Thr Gly Tyr Asn  
 65 70 75 80  
 Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Ser Asn  
 85 90 95  
 Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val  
 100 105 110  
 Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val  
 115 120 125  
 Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala  
 130 135 140  
 Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu  
 145 150 155 160  
 Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly  
 165 170 175  
 Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp  
 180 185 190  
 Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro  
 195 200 205  
 Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys  
 210 215 220  
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile  
 225 230 235 240  
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro  
 245 250 255  
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val  
 260 265 270  
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val  
 275 280 285  
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln  
 290 295 300  
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln  
 305 310 315 320  
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala  
 325 330 335  
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro  
 340 345 350  
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala  
 355 360 365  
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu  
 370 375 380  
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr  
 385 390 395 400

```
<210> 14
<211> 613
<212> PRT
<213> Artificial Sequence
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<220>
<223> Fusion protein with N-terminal portion of DAV-1 heavy chain
and SCF mature peptide
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[illegible]

305                      310                      315                      320  
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala  
                                  325                      330                      335  
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro  
                                  340                      345                      350  
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala  
                                  355                      360                      365  
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu  
                                  370                      375                      380  
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr  
 385                      390                      395                      400  
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr  
                                  405                      410                      415  
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe  
                                  420                      425                      430  
 Ile Cys Ser Val Leu His Glu Phe Cys Arg Tyr Pro Ala Gln Trp Arg  
                                  435                      440                      445  
 Pro Gln Gly Ile Cys Arg Asn Arg Val Thr Asn Asn Val Lys Asp Val  
                                  450                      455                      460  
 Thr Lys Leu Val Ala Asn Leu Pro Lys Asp Tyr Met Ile Thr Leu Lys  
 465                      470                      475                      480  
 Tyr Val Pro Gly Met Asp Val Leu Pro Ser His Cys Trp Ile Ser Glu  
                                  485                      490                      495  
 Met Val Val Gln Leu Ser Asp Ser Leu Thr Asp Leu Leu Asp Lys Phe  
                                  500                      505                      510  
 Ser Asn Ile Ser Glu Gly Leu Ser Asn Tyr Ser Ile Ile Asp Lys Leu  
                                  515                      520                      525  
 Val Asn Ile Val Asp Asp Leu Val Glu Cys Val Lys Glu Asn Ser Ser  
                                  530                      535                      540  
 Lys Asp Leu Lys Lys Ser Phe Lys Ser Pro Glu Pro Arg Leu Phe Thr  
 545                      550                      555                      560  
 Pro Glu Glu Phe Phe Arg Ile Phe Asn Arg Ser Ile Asp Ala Phe Lys  
                                  565                      570                      575  
 Asp Phe Val Val Ala Ser Glu Thr Ser Asp Cys Val Val Ser Ser Thr  
                                  580                      585                      590  
 Leu Ser Pro Glu Lys Asp Ser Arg Val Ser Val Thr Lys Pro Phe Met  
                                  595                      600                      605  
 Leu Pro Pro Val Ala  
 610

<210> 15  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> PCR primer for amplification of CH3 region of  
 DAV-1 heavy chain.

<400> 15  
 cctgctctgt gtttacatga ggg

23

<210> 16  
 <211> 19  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> PCR primer for amplification of CH1 region of  
 DAV-1 heavy chain.

<400> 16



19

<220>  
<223> PCR primer for amplification of DAV-1 kappa chain CL-A.

20

<220>  
<223> PCR primer for amplification of DAV-1 kappa chain  
CL-B.

20

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<220>
<221> PEPTIDE
<222> (0)...(0)
<223> Peptide spanning integrin binding site on penton base.
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<210> 20
<211> 9
<212> PRT
<213> Adenovirus
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<220>
<221> PEPTIDE
<222> (0)...(0)
<223> Epitope on penton base integrin binding site recognized by DAV-1.
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```
<210> 21
<211> 31
<212> DNA
<213> Artificial Sequence
```

```
<220>
<223> PCR sense primer for subcloning DAV-1 heavy chain for whole antibody
      or Fab'2 constructs.
```

<400> 21  
 ggtaccgccca ccatgggatg gagctggatc t 31  
  
 <210> 22  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> PCR antisense primer for subcloning DAV-1 heavy chain for  
 whole antibody construct.  
  
 <400> 22  
 gaattcatgt aacacagagc agga 24  
  
 <210> 23  
 <211> 35  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> PCR sense primer for subcloning DAV-1 light chain for  
 whole antibody or Fab'2 constructs.  
  
 <400> 23  
 aagcttgcca ccatggagac agacacaatc ctgct 35  
  
 <210> 24  
 <211> 28  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> PCR antisense primer for subcloning DAV-1 light chain for  
 whole antibody or Fab'2 constructs.  
  
 <400> 24  
 tctagatgtc tctaactc attcctgt 28  
  
 <210> 25  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> PCR antisense primer for subcloning DAV-1 heavy chain for  
 Fab'2 constructs.  
  
 <400> 25  
 gaattctgat acttctggga ctgt 24  
  
 <210> 26  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> PCR sense primer for subcloning TNF $\alpha$  into DAV-1/TNF $\alpha$   
 fusion construct.  
  
 <400> 26  
 gaattcgtca gatcatcttc tcgaac 26

<210> 27  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> PCR antisense primer for subcloning TNF $\alpha$  into DAV-1/TNF $\alpha$   
 fusion construct.  
  
 <400> 27  
 gaattctaca gggcaatgat cccaaa 26  
  
 <210> 28  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> PCR sense primer for subcloning IGF-1 into DAV-1/IGF-1  
 fusion construct.  
  
 <400> 28  
 gaattcggac cggagacgct ctgcgg 26  
  
 <210> 29  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> PCR antisense primer for subcloning IGF-1 into DAV-1/IGF-1  
 fusion construct.  
  
 <400> 29  
 gaattctaag ctgacttggc aggctt 26  
  
 <210> 30  
 <211> 96  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> PCR sense primer for subcloning EGF into DAV-1/EGF  
 fusion construct.  
  
 <400> 30  
 gaattcaata gtgactctga atgtcccctg tcccacgatg ggtactgcct ccatgatggt 60  
 gtgtgcatgt atattgaagc attggacaag tatgca 96  
  
 <210> 31  
 <211> 98  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> PCR antisense primer for subcloning EGF into DAV-1/EGF  
 fusion construct.  
  
 <400> 31  
 gaattctagc gcagttccca ccacttcagg tctcgggtact gacatcgctc cccgatgtag 60  
 ccaacaacac agttgcatgc atacttgtcc aatgcttc 98

<210> 32  
<211> 27  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> PCR sense primer for subcloning SCF into DAV-1/SCF  
fusion construct.

<400> 32  
gcggccgcaa gggatctgca ggaatcg

27

<210> 33  
<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> PCR antisense primer for subcloning SCF into DAV-1/SCF  
fusion construct.

<400> 33  
tctagagtgc aacaggggggt aacata

26

T00T20"2EE0660